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Digital Rights Management (DRM) in Libraries: Present and Future Outlook

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Abstract

This paper critically examines the current landscape and future prospects of Digital Rights Management (DRM) in libraries within the digital era. DRM comprises a set of technologies, protocols, and strategies that enable authors, publishers, and content creators to regulate, monitor, and protect their intellectual property when disseminated through digital platforms. The exponential growth of digital content, accelerated by the COVID-19 pandemic, has increased the demand for robust DRM systems, particularly in libraries where e-resources, including e-books, e-journals, databases, e-theses, and digital research reports—have proliferated. The study explores DRM tools, techniques, and best practices, with emphasis on Indian legislative frameworks governing copyright and digital rights. It highlights the strategic role of DRM in supporting the "trinity" of digital libraries: creators, content, and users. The paper also discusses practical applications, integration with library management systems, and the promotion of fair use policies. By adopting DRM strategies, libraries can protect intellectual property, ensure legal compliance, and provide secure, equitable access to digital content, reinforcing their role as custodians of knowledge in the digital age.

Keywords: *Digital rights management, DRM, Intellectual property rights, Copyright protection, E-resources, Indian legislation, Fair use, Libraries.*

1. Introduction

Digital rights management (DRM) is a technology to protect copyrights for digital content. DRM works by several means to control and prevent digital content from being shared on digital platforms, i.e. computer networks or telecommunication networks. With the rise of the internet and peer-to-peer file exchange services, online piracy has been banned for copyrights content. DRM technology makes it possible to reduce theft or share content over digital platforms.

Digital Rights Management (DRM) refers to a suite of technologies and protocols designed to protect the copyrights of digital content such as music, movies, e-books, and software. It enables content owners, publishers, and distributors to control how their digital assets are accessed, distributed, and used. By leveraging encryption, access controls, and licensing systems, DRM ensures that only authorized users can access protected material, preventing unauthorized copying, sharing, or piracy.

DRM also facilitates innovative business models for digital distribution platforms by regulating content usage and enabling features like subscription-based access. Additionally, it serves as a critical tool for information providers, not only safeguarding their intellectual property but also discouraging unauthorized users from converting or misusing digital data.

As we know the demand for digital content i.e. E-books, E-Journals, E-magazines, and E-Newspapers, etc., has increased rapidly since the last year due to the pandemic of covid-19. Our education system has also been affected due to this pandemic. Online classes have filled the gap of physical classes for the time being but access to quality information to their study and research purpose they depend on to digital content, they are restricted to visit the library in physical mode regularly and search for the quality content for their study or research. Library society and professionals are trying to serve their users with different digital methods. They try to create and procure more and more digital content for their users but they always have the fear of copyright policy when they fulfil users' demand on digital platforms. To overcome or minimize this fear we can use Digital Rights Management technology in libraries. DRM is a technology that permits rights to creator or author to set and enforce terms and conditions by which users use their intellectual property rights, owners are typically copyrights-holding companies like music, film, book, or software publishers, etc. DRM is used to control how documents, i.e. e-books, e-journals, e-magazines, etc. are used on digital platforms. Initially, DRM is used in media companies to curb piracy of their digital content by restricting users to create a copy. Today, DRM is playing an important role in data security and protecting the right of contents creators.

2. Literature Review

Several studies explore Digital Right Management (DRM) and intellectual property rights (IPR) challenges in the digital library context. Hombal and Prasad (2012) highlight copyright issues in digital libraries, while Baraliuc et al. (2012) examine the Anti-Counterfeiting Trade Agreement (ACTA) in the EU, focusing on balancing copyright enforcement with fundamental rights. Tamilselvan and Balasubramanian (2012) address copyright violations, legislative disparities, and the use of cryptography and digital watermarks to protect digital content.

Handa and Bhatt (2015) discuss IPR concerns specific to Indian libraries, and Mir (2016) emphasizes the need for librarian roles in copyright protection and user awareness. Chattopadhyay (2016) investigates copyright concerns in digital/electronic content, DRM, and legal frameworks for library access. Niqresh (2018) identifies IPR issues in managing web resources, while Sanjaya (2021) focuses on trademark infringement through domain name abuse and dispute resolution methods. Patil and Agarwal (2019) examines digital rights management (DRM) as a key component of electronic resource management and library services. The study emphasizes DRM's role in protecting copyright by preventing unauthorized redistribution and limiting copying of digital content, while highlighting its importance in balancing access and compliance in modern libraries. Panda (2021) explores DRM, IPR issues, and LIS professionals' roles in managing digital content, stressing the need for IPR awareness programs to mitigate copyright risks in libraries and protect the right of original work creator’s. Tamilselvan (2024) proposes a blockchain-based DRM framework that replaces centralized control with a tamper-proof ledger and smart contracts to manage access permissions, validity periods, and usage conditions. Built on Hyperledger Fabric, the system incorporates uPort-based decentralized identity for secure, privacy-preserving user authentication. Automated licensing through smart contracts reduces administrative burden

while improving transparency, efficiency, and auditability. The framework supports a secure digital-library ecosystem with broader implications for digital content distribution and copyright protection.

Edam-Agbor and Akin-Fakorede (2025) examine how DRM supports digital privacy in academic libraries, emphasizing clear privacy policies, access controls, encryption, watermarking, transparency, and regulatory compliance. Similarly, Laboso et al. (2026) highlight blockchain-based DRM for library systems, noting its ability to ensure immutability, transparency, decentralized access control, and cryptographic security. Their findings show that blockchain-enabled DRM improves trust, accountability, and efficiency in secure digital library environments.

3. Objectives of the Study

The objectives of study are as follows

i. To explore the current and future prospects of Digital Rights Management (DRM).
ii. To outline effective tools and techniques for implementing DRM practices in libraries.
iii. To examine the legal framework and Indian legislation related to DRM in libraries.
iv. To identify the challenges for implementing DRM in libraries.

4. Essential Role and Significance of Digital Rights Management (DRM)

In today's digital environment, Digital Rights Management (DRM) has become indispensable for protecting intellectual property and ensuring the lawful use of digital resources. By preventing unauthorized copying, distribution, and access, DRM not only minimizes piracy but also strengthens overall content security. Its adoption in libraries and other digital platforms is vital for several reasons:

(i) Safeguarding Revenue: For content creators and publishers, financial sustainability depends on the legitimate use of digital materials. DRM helps regulate access by enforcing licensing conditions and restricting unauthorized distribution. This mechanism protects revenue streams and enables the fair monetization of digital assets.

(ii) Promoting Content Creation: The production of high-quality digital resources demands significant effort, creativity, and financial investment. DRM reassures authors, publishers, and investors that their work is protected from misuse. This assurance fosters ongoing investment in innovative, diverse, and valuable digital content.

(iii) Ensuring Copyright Compliance: In the global digital landscape, compliance with copyright laws is essential. DRM supports this by enforcing licensing agreements and usage restrictions, protecting creators' rights while guiding users toward responsible and ethical engagement with content.

(iv) Preserving Market Integrity: The spread of unauthorized or counterfeit materials threatens the stability of digital markets. DRM combats this issue by ensuring authenticity and reliability, thereby sustaining a transparent and trustworthy digital ecosystem where creators and users alike benefit.

The digital content ecosystem comprises publishers, device manufacturers, and educational institutions, all of which rely on DRM for secure and controlled distribution of materials.

(i) **Digital Media Publishers:** Publishers apply DRM technologies to prevent piracy and unauthorized distribution of their digital assets. It ensures that only licensed users can access their intellectual property.

(ii) **Digital Component Manufacturers:** Hardware manufacturers, such as those producing e-readers, tablets, or media players, integrate DRM systems at the device level. This ensures that only authorized content is accessible, enhancing security across digital platforms.

(iii) **Educational Institutions:** Libraries within schools, colleges, and universities provide access to a wide range of digital resources. DRM helps regulate usage in accordance with licensing agreements, preventing unauthorized sharing and ensuring compliance with publishers' rights.

5. Future-Ready Approaches to DRM Management in Libraries

DRM technologies include, first, technologies that can be used to impose direct functionality restrictions on digital content. A simple example is encryption technology that restricts access to a database to those individuals or devices having the appropriate password or key, but DRM technologies also can impose more complex restrictions. For example, they can be designed to prevent users from taking particular actions with the data, or to regulate the manner in which they make take those actions. Thus, DRM technologies can prevent or limit the acts.

DRM has a wide range of categories to control or restrict the usage of digital content on different devices. We have discussed some important DRM techniques that are mostly used in digital platforms before to make them available to its users. DRM technology working concept are categorized in two parts as follows:

1. Encryption of digital content before available on the digital platform to the users.
2. Authentication system to ensure that only authorized can access the digital content.

The details description of DRM technology working system are categorized in six sections as following.

(i) **Encryption:** Encryption is a fundamental DRM technique that converts information or digital content into a secret code, concealing the original data. The science of encrypting and decrypting data is called cryptography. Encryption converts data into an unreadable format known as "cipher text," while decryption restores the original content. Two primary encryption techniques include:
   - **Public Key:** Shared openly with all users, including unknown ones.
   - **Private Key:** Restricted to the owner only.

(ii) **Watermarking:** Watermarking involves embedding hidden information, such as a copyright stamp or signature, into digital content (images, videos, audio, etc.). This embedded data can only be extracted using a secret key, ensuring the protection of intellectual property.

(iii) **Digital Certificates:** Digital certificates serve as electronic credentials, similar to physical identity cards like voter IDs or driving licenses. They link an individual's identity to a pair of electronic keys for encryption and decryption. Issued by trusted certification authorities (CAs), these certificates include the owner's public key, private key, expiration date, issuer name, serial number, and a digital signature of the issuer.

The widely adopted X.509 international standard defines the format for these certificates.

(iv) Digital Fingerprinting: Digital Fingerprinting, also known as forensic or individual watermarking, digital fingerprinting identifies unique characteristics or patterns within content. Stored in a database, these fingerprints verify the authenticity of content when accessed. This technique is commonly used for audio and video content on platforms like YouTube, which employs video fingerprinting for copyright protection.

(v) Secure Communication Protocols: Protocols such as Secure Sockets Layer (SSL) and Transport Layer Security (TLS) enable secure communication between client and server applications. They are designed to prevent eavesdropping, tampering, and message forgery during data transmission.

(vi) Access Control: Access control mechanisms aim to restrict access to copyrighted materials and limit unauthorized copying, ensuring that only authorized users can interact with protected content.

6. Significance of DRM in Libraries

The pandemic has adversely impacted all sectors include libraries, prompting them to adapt by delivering services through digital platforms due to limited physical access. This shift raises copyright concerns, addressed by creating digital repositories and digitizing materials to promote open access. Digital Rights Management (DRM) plays a crucial role in controlling access, tracking usage, and regulating digital content distribution, ensuring copyright compliance. Effective DRM implementation requires foundational support with hardware and software that enable encryption and adhere to licensing agreements, safeguarding digital materials against unauthorized use.

Authors and creators sought a technology that would give them control over their content, allowing them to govern its authorized use and manage the consequences throughout its lifecycle. This need led to the development of Digital Rights Management (DRM). DRM is designed to regulate the use of digital content, but it has also raised concerns about potential misuse. It can be employed for questionable purposes, such as infringing on privacy, personal profiling, price discrimination based on identifiable information, and hindering the growth of open-source software. For libraries, DRM poses challenges to the first-sale doctrine, preservation efforts, and introduces pay-per-use pricing models.

In 2003, the Congressional Internet Caucus Program on Digital Rights Management and the American Library Association described DRM as a set of technologies that control the use of digital content. Information scientists, engineers, and technologists have proposed DRM as a solution to address key issues, including:

(i) **Digital Rights Enforcement (DRE):** Ensuring compliance with content usage rules.
(ii) **Digital Rights Management:** Defining and managing user rights to access content.
(iii) **Standardization for Interoperability:** Promoting compatibility across different systems and platforms.

The pandemic has affected libraries globally, pushing them to transition to digital platforms to continue serving users. However, this shift raises concerns about copyright policies. To address this, libraries create digital repositories and convert materials for open access. Digital Rights Management (DRM) technology helps manage copyright by allowing creators to control access, track usage, and limit distribution of digital content. For effective DRM use,

libraries need the right hardware and software to support encrypted content and comply with licensing agreements, preventing unauthorized copying, printing, and sharing.

However, many organizations and libraries worry that DRM could be exploited by copyright holders to restrict user rights traditionally protected under copyright law, such as fair use, the first-sale doctrine, and limitations on copyright terms. These fears highlight the delicate balance between protecting content and preserving user freedoms. Users can access this encrypted content via a license that the user can get from the license manager. A license may be a digital certificate, passcode, or any other machine-readable rights expression language that contains the term of use and the information required to access the encrypted content on a digital platform.

7. Role of Library Professionals for DRM in Libraries

Some library professionals hold varying opinions about DRM, as it often places significant control over library digital content in the hands of technology companies, publishers, and intermediaries. If not carefully balanced, DRM technology can lead to several issues, including:

i. Eliminating the "first sale" doctrine.
ii. Imposing a "pay-per-use" model.
iii. Enforcing time limits on content usage.
iv. Restricting preservation and archiving efforts.
v. Eliminate the ‘fair use policy of copyrights law.
vi. Conducting IPR awareness and training programmes for the users to fair use of digital contents.

8. Legal Perspective and Indian legislation for DRM in libraries

The traditional copyrights law has challenged the digitization process of any content in mainly two views:

i. It has enabled nearly cost-free reproduction and large-scale distribution of digital content.
ii. Existing digital content easily can be remixed and “mashed-up” (combined in various ways) with other content to produce new works.

In response to these changes, copyrights holders have sought greater protection through legal and technological remedies.

For DRM to be effective, it is crucial to address the legal concerns of both users and rights holders. It is unlikely that all the fair uses expected by users can be automatically accounted for in a DRM system. There may be instances where users must apply to a license server or distributor to request permission for fair use, such as a magazine writer seeking the right to excerpt from a document. However, this process would require third-party authentication and accreditation of users (e.g., verifying that a user is a licensed journalist), which is not typically part of current DRM implementations. Given that DRM systems have the potential to impose stringent control over content, legislative action may be necessary to mitigate overly restrictive measures.

i. **Fair Use:** Fair use, also known as personal use, allows for the reproduction of copyrighted works under specific conditions. For instance, in the famous *Sony-Betamax* case (Universal City Studios v. Sony Corporation of America, 446 U.S. 417), the U.S. Supreme Court ruled that Sony could not be held liable for the illegal copying of copyrighted works made using its video recorder, establishing the principle of fair use in copyright law. Many countries, including the U.S. under Section 107 of the Copyright Act, regulate and recognize fair use.

ii. **Privacy:** DRM systems have frequently been criticized for violating user privacy, with the ability to track the usage of DRM-protected media being a major concern. The tracking feature is often cited as a potential privacy violation, as it allows the monitoring of users' activities, even when they are not using DRM-enabled works. While some argue that usage tracking is essential for meeting DRM objectives, it raises significant privacy concerns, particularly regarding the extent of monitoring and how it might be exploited beyond the intended scope.

iii. **Right Holder Control:** The degree of control that rights holders exert over DRM-protected works is another critical issue. In an enterprise setting, strict control over digital content might be necessary, as businesses need to define precise boundaries for how their works can be used. However, consumers generally prefer less restrictive DRM systems. This tension is evident in the success of Apple's iTunes Music Store, which offers DRM-protected music with minimal control, making it one of the most popular platforms compared to other more restrictive services.

iv. **Rights Management Information (RMI):** Rights Management Information refers to metadata embedded in digital content, such as the title, creator, owner, and usage terms. However, RMI specifically excludes any procedures that identify the user. In India, the Copyright Act has introduced anti-circumvention provisions (Sections 65A and B) to protect technological measures used by copyright holders to safeguard their works. Section 65A deals with technological protection measures (TPM), while Section 65B penalizes the removal or alteration of rights management information, ensuring that users can only be punished if they knowingly distribute works with altered or removed RMI.

Indian and USA Legislation Comparison

In the U.S., the Digital Millennium Copyright Act (DMCA) introduced provisions for anti-circumvention, focusing on prohibiting access control measures while acknowledging that copying may be allowed under fair use. In contrast, India's Copyright Act does not distinguish between access and copy control measures. The Indian legislation focuses on criminal remedies for removing or altering rights management information, but it lacks a civil right of action for copyright holders, which is provided under U.S. law. This difference in legal frameworks underscores the need for balanced copyright protection measures to address both creators' rights and user freedoms.

9. Challenges Ahead DRM in Libraries

While DRM offers benefits, it also presents challenges that need to be addressed:

i. **Balancing Protection & User Experience:** Striking the right balance between content protection and user experience is key. Overly restrictive DRM can frustrate legitimate users. Organizations must evaluate security and usability trade-offs, considering platform compatibility and user preferences, and involve users in testing to ensure a smooth experience.

ii. **Interoperability & Compatibility:** DRM technologies may have compatibility issues across devices and platforms. To address this, adopting open standards and collaborating with stakeholders can enhance cross-platform content distribution and reduce vendor lock-in.
iii. **Legal & Ethical Considerations:** DRM raises concerns related to privacy, fair use, and consumer rights. Organizations must comply with laws, ensure data protection, and consider fair use exceptions. Restrictive DRM could limit legitimate uses, so transparency and respect for consumer rights are important.
iv. **Circumvention & Security Risks:** No DRM system is entirely secure, and there are risks of circumvention through techniques like reverse engineering. Organizations need to stay updated on threats, implement multi-layered security, and manage insider threats through access controls and training.

10. Suggestions and Future Research Areas

The literature review findings and conclusions highlight that countries like the United States actively promote the use of DRM systems, while countries such as France argue that DRM restricts users and hinders competitive practices. Based on these differences, this study recommends the establishment of globally accepted policies to ensure consistent perceptions of DRM across countries.

Although the publishing industry is well-established, with low entry barriers, it still plays a crucial role in a country's economic, social, and cultural development. Book publishing industries thrive best when they extend beyond traditional educational centers and become accessible and beneficial to all, rather than being seen as a luxury. Governments must create policies and regulations that balance DRM technology, ensuring users can access information while authors receive fair compensation.

DRM technology operates around a core model where the resource, rights owner, and user are all integral to managing usage rights. In light of this, the study recommends that policies be amended to allow libraries, once they have purchased digital content, to freely use and store it without barriers or restrictions, thereby improving access and sharing of e-books within libraries.

Rights management technologies are here to stay, and future systems will need to incorporate DRM to comply with legislative requirements and meet the demands of publishers and consumers. The RMS platform is an essential first step in this direction, but the adoption of open standards is necessary to ensure seamless protection across various operating systems and devices.

11. Conclusion

Digital Rights Management (DRM) has become increasingly essential in modern libraries, particularly highlighted during the COVID-19 pandemic, when the reliance on digital resources surged dramatically. In an environment where information is primarily accessed online, DRM serves as a crucial mechanism for protecting the intellectual property of authors, publishers, and content creators. One of the most significant challenges facing library professionals is striking a balance between safeguarding digital content against unauthorized use and ensuring seamless, lawful access for legitimate users. This involves

navigating complex issues such as copyright compliance, internet security, and user privacy while implementing effective DRM policies.

The emerging generation of library professionals is notably more attuned to these complexities. Their role extends beyond simply deploying existing DRM systems; they are actively involved in evaluating, adopting, and even shaping technologies that are adaptive, scalable, and user-friendly. By understanding the nuanced requirements of both the library community and content creators, they can contribute to the development of DRM solutions that protect rights without unduly restricting access to knowledge.

Ultimately, library professionals carry the responsibility of upholding ethical and legal standards in the use of digital content. DRM tools enable them to enforce copyright protections, prevent unauthorized reproduction or distribution, and ensure that access aligns with intellectual property laws. By effectively integrating DRM strategies, libraries can achieve a dual objective: safeguarding content while facilitating responsible and equitable access to information, thereby supporting both creators and users in a digitally connected world.

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